

What is claimed is:

1. A method for measuring carbon numbers and molecular weights of isoparaffins using a field ionization mass spectrometer that comprises reducing an emitter current in the field ionization mass spectrometer below a threshold value to substantially reduce fragmentation of isoparaffin molecular ions.
2. The method of claim 1 wherein said fragmentation of isoparaffin molecular ions is less than about fifty (50) percent.
3. The method of claim 1 wherein said emitter current is less than about 20 mA for an emitter ranging from about 5 microns to about 50 microns in diameter.
4. The method of claim 3 wherein said emitter current ranges from about 3mA to about 20 mA.
5. The method of claim 1 wherein said isoparaffins are characterized as  $C_x$  isoparaffins where x is greater than about 10.
6. The method of claim 5 wherein x ranges from about 10 to about 50.
7. The method of claim 1 wherein a carbon number distribution of isoparaffins mixtures is determined by directly measuring a molecular ion distribution of the isoparaffin mixtures.